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A.D. 1873, 21<sup>st</sup> APRIL. N° 1445.

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**Treating Sewage.**

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**LETTERS PATENT** to Henry Young Darracott Scott, of Ealing, in the County of Middlesex, Major-General, C.B., for the Invention of “**IMPROVEMENTS IN THE TREATMENT OF NIGHT SOIL AND SEWAGE MATTERS, AND IN THE MANUFACTURE OF MANURES THEREFROM.**”

Sealed the 30th September 1873, and dated the 21st April 1873.

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**PROVISIONAL SPECIFICATION** left by the said Henry Young Darracott Scott at the Office of the Commissioners of Patents, with his Petition, on the 21st April 1873.

I, HENRY YOUNG DARRACOTT SCOTT, of Ealing, in the County of Middlesex, Major-General, C.B., do hereby declare the nature of the said Invention for “**IMPROVEMENTS IN THE TREATMENT OF NIGHT SOIL AND SEWAGE MATTERS, AND IN THE MANUFACTURE OF MANURES THEREFROM,**” to be as follows :—

The object of this Invention is the economical and inoffensive treatment of sewage and night soil. The process essentially consists in the utilisation of the deposit obtained from liquid sewage by the lime



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*Scott's Improvements in Treating Sewage, &c.*

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method of precipitation for the deodorisation of the night soil of towns, and the retention of the fertilising elements of such excrementitious matters.

In carrying out my Invention I precipitate the sewage with lime in the usual manner. The deposit thus obtained is collected and dried by 5 any convenient method, but with the view of preventing nuisance and bringing the nitrogen present into a form in which it can be retained, I sometimes mix with the wet deposit a small quantity of free lime. In order to retain the ammonia set free in the drying process I lightly cover the wet deposit with some substance which has been impregnated 10 with acid, but which does not neutralize the acid employed. Sawdust, hay, or straw answer very well, but I may also use vegetable charcoal for the purpose, or dried horsedung or shoddy. The deposit may be dried on hot floors, or when previously compressed into cakes or allowed to consolidate spontaneously in the open air it may be arranged in drying 15 chambers together with the acidified matters above referred to and be there desiccated. The desiccation may with advantage be carried to scorching when the size of the town is such as to justify the use of special apparatus. In such cases also the ammonia evolved from the drying or scorching mass may be collected by well known methods 20 instead of the above. For small places simple air drying may be employed. The deposit may for instance be spread over a porous surface and be lightly covered with the acidified matters above referred to to retain the ammonia which would otherwise escape.

When the deposit has been dried or scorched it is to be reduced to a 25 powder (if this has not been done in the desiccating process), and it is then applied in dry closets, privies, or cesspool matters either by mechanical contrivances or by hand. I sometimes mix with the powdered deposit lime, chloride of lime, carbolate of lime, or chlorides of the cheaper metals to assist in the deodorization of the night soil and to retain the 30 phosphoric acid of the soluble phosphates. I sometimes also cover the bottoms of the cesspools with a layer of lime for similar objects. The liquid which drains off can be treated for the recovery of ammonia either with a salt which will retain the substance, or when the night soil is to be converted into manure at a depôt by distillation. 35

The mixed night soil and sewage precipitate obtained as above will have a sufficiently fertilizing value to find a market at some distance



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*Scott's Improvements in Treating Sewage, &c.*

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from the town, and by its sale towns whilst clarifying their sewage will find the means of ridding themselves of their deposit which is in itself so weak in fertilizing elements as to be practically worthless if dealt with separately.

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5 SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Henry Young Darracott Scott in the Great Seal Patent Office on the 21st October 1873.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, HENRY YOUNG DARRACOTT SCOTT, of Ealing, in the County of Middlesex,  
10 Major-General, C.B., send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twenty-first day of April, in the year of our Lord One thousand eight hundred and seventy-three, in the thirty-sixth year of Her reign, did, for Herself, Her heirs and successors, give  
15 and grant unto me, the said Henry Young Darracott Scott, Her special licence that I, the said Henry Young Darracott Scott, my executors, administrators, and assigns, or such others as I, the said Henry Young Darracott Scott, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times  
20 thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN THE TREATMENT OF NIGHT SOIL AND SEWAGE MATTERS, AND IN THE MANUFACTURE OF MANURES THEREFROM," upon the condition  
25 (amongst others) that I, the said Henry Young Darracott Scott, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal  
30 Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Henry Young Darracott Scott, do hereby declare the nature of my said Invention, and in what manner



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*Scott's Improvements in Treating Sewage, &c.*

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the same is to be performed, to be particularly described and ascertained in and by the following statement (that is to say) :—

The object of this Invention is the economical and inoffensive treatment of sewage and night soil. The process essentially consists in the utilization of the deposit (obtained from liquid sewage by the lime 5 method of precipitation) for the deodorization of night soil and the retention of its fertilizing elements.

In carrying out my Invention I precipitate the sewage with lime in the usual manner. The deposit thus obtained is collected and dried in any convenient manner or by means of any suitable apparatus, but 10 with the view of preventing nuisances I sometimes mix with the wet deposit a small quantity of free lime, and in order to retain the ammonia set free in the drying process I lightly cover the wet deposit with some substance which has been impregnated with sulphuric or hydrochloric acid, but which does not neutralize the acid employed. I may use 15 sulphate of iron for a similar purpose, or chloride of iron will effect a similar result. Sawdust, hay, or straw answer very well as substances which may be impregnated with the acid or salt containing the acid which is used to fix the ammonia, but I may also use vegetable charcoal or dried horsedung or shoddy, or other refuse substances for this 20 purpose; the object being merely the employment of a vehicle for the acid, and in so far as this vehicle contains nitrogenous matter it will be better suited (of course) to enrich the deposit. The deposit may be dried on hot floors, or when previously compressed into cakes or allowed to consolidate spontaneously the deposit may be arranged in layers in 25 drying chambers together with the acidified substances above referred to, and be there desiccated, or it may be dried by simple exposure to currents of air in any suitable apparatus. The desiccation may be carried to the point of scorching when the size of the town is such as to justify the use of special apparatus for this purpose. In such cases the 30 ammonia evolved from the drying or scorching mass may be collected by well known methods. For small places simple air drying may be employed. The deposit may for instance be spread over a porous surface and be lightly covered with the acidified matters above referred to in order to retain the ammonia which would otherwise escape. 35

When the deposit has been dried, or dried and scorched it is to be reduced (in the generality of cases) to a powder (if this has not been



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*Scott's Improvements in Treating Sewage, &c.*

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done in the desiccating process), and it is then applied in dry closets or privies, or may be applied to cesspool matters either by any of the well known mechanical contrivances or by hand.

When the contents of cesspools or pails are carried to a depôt to be  
5 dealt with, I mix the excreta with a sufficient quantity of the dried  
sewage deposit to make it into forms (such as bricks) suitable for drying.  
The bricks thus formed are then desiccated either by exposure to a  
current of air or in any other way, and are ground to powder and reused  
to mix with a fresh quantity of night soil. This compound after being  
10 made into bricks is subjected to similar treatment, and the process may  
be repeated several times. I sometimes mix with the powdered deposit,  
lime, chloride of lime, carbolate of lime, or chlorides of the cheaper  
metals (such as iron and zinc), or I may use sulphates of these metals  
for the same purpose; or any other available disinfectant, as for instance  
15 sulphate of lime, chloride of sodium, or charcoal may be employed.

I find that for certain purposes I can with advantage modify the  
above mode of procedure. In the case of cesspools the process described  
is perhaps the best and simplest, and indeed in all cases in which the  
absorbent and deodorant is applied by persons specially appointed for the  
20 purpose of spreading it over the excreta from time to time, no modifi-  
cation of the process need be made, but there are other cases in which  
certain peculiarities of the dried powder thus obtained should be  
removed.

First. Unless the deposit has been heated to the point of scorching, it  
25 does not always readily wet when applied to liquids but will float on  
their surfaces, the air contained in the pores of the powder being with  
great difficulty expelled.

Secondly. The dried powder is too dusty for use in Moule's and other  
dry closets when the charge (applied after each use of the closet) is  
30 thrown down suddenly by mechanical contrivances. Each of these  
defects may be readily cured by the very simple expedient of com-  
pounding with the deposit before it is dry deliquescent salts which may  
prevent the material from becoming dusty; and for this purpose I prefer  
to employ those which are in themselves disinfectants and deodorants,  
35 such as chlorides of iron, calcium, and sodium, but I may also mix with  
it shoddy or dried road scrapings.



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*Scott's Improvements in Treating Sewage, &c.*

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In applying the dried sewage deposit to the Goux system, the deposit whilst still moist is moulded into the shapes required by that system, and is then dried. Absorbents such as are now employed under the Goux plan may be mixed with the moist deposit before moulding it.

In the employment of the dried deposit in cesspools and other like 5 receptacles I sometimes cover the bottoms of such receptacles with a layer of lime and then allow the liquid to drain through the layer of lime into the sewers, the ammonia being retained by means of filters of phosphate of magnesia, or if the ammonia be allowed to escape the lime will still have the effect of rendering the urine and other drainings from 10 the solid excreta innocuous. If the cesspools or other receptacle do not drain into the sewers, the liquid urine may be expressed from the wet compost of excreta or deposit, and be treated at a factory for the recovery of ammonia.

The mixed night soil and sewage precipitate obtained as above will 15 have a sufficiently fertilizing value to find a market at some distance from the town, and by its sale, towns (while clarifying their sewage and removing its offensiveness) will find the means of ridding themselves of a deposit which is in itself too weak a fertilizer to find a market, and is therefore (if dealt with as a manure separately) practically worthless. 20

The advantages of the process are in brief these:—The deodorant and absorbent employed is by the addition of the night soil enriched with fertilizing matter which makes its practical value approximate more nearly to its theoretical value, and the night soil is not so much degraded as it would be by admixture with absorbents and deodorants which have 25 no manurial value, and which therefore practically reduce the theoretical value due to its fertilizing elements.

Although I have above stated that my claim has reference to the lime method of precipitation, I wish it to be understood that I should consider the employment of iron or alumina salts in conjunction with 30 lime where such lime is used, not merely to neutralize or combine with the acids of these precipitants, but in effect as the chief precipitant of the sewage water (producing a copious deposit of carbonate of lime from it) to be an infringement of the right granted to me under these Letters Patent. 35

Having now explained my Invention, and the means whereby I carry the same into effect, I wish it to be understood that under the before in



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*Scott's Improvements in Treating Sewage, &c.*

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part recited Letters Patent I claim as the Invention secured to me by Letters Patent as aforesaid the use of the deposit obtained from sewage by what is termed the lime method of precipitation (and understood as such by chemists) as a deodorant and absorbent of sewage as herein set  
5 forth, and also for rendering such deodorant and absorbent more efficacious by treating it as herein set forth, and combining it with salts of iron, alumina, and lime, as and for the purposes above set forth.

10 In witness whereof, I, the said Henry Young Daraacott Scott, have hereunto set my hand and seal, the Twentieth day of October, in the year of our Lord One thousand eight hundred and seventy-three.

HENRY Y. D. SCOTT. (L.S.)

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